MOSES PRASAD VARGHESE

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EDUCATION

Master of Science in Mechanical Engineering (Data Science) | University of Washington, Seattle, WA | June 2023
- Relevant coursework: Software Development for Data Scientists, Data Science and Materials Informatics, Natural Language Processing, Database Management Systems, Reinforcement Learning, Deep Learning, Computer Vision, Applied Parallel Computing, Control Systems
- GPA: 3.85/4.00

Bachelor of Technology in Mechanical Engineering | National Institute of Technology, Rourkela, India | June 2018
- Relevant coursework: Data Structures and Algorithms, C and C++ programming, Advanced Mechatronics, Computer Graphics for CAD/CAM
- CGPA: 8.33/10.00

EXPERIENCE

Database and Student Programs Assistant | FIUTS, Seattle, WA | August 2023 – August 2024
- Analyzed to automate read/write to Salesforce database with Process Builder, Flows and Integration features
- Facilitated with student programs to setup, manage student data and lead activities
- Initiated to improve data warehouse performance by indexing and removing redundant and duplicate data

Data Scientist | Stealth Startup, Seattle, WA | October 2023 – November 2023
- Coordinated in web scrapping for data collection and understanding data storage for better search results
- Developed a search and recommendation feature for web-application to improve search personalization
- Initiated to develop metrics for recommendation system with decision-support and ranking-based metrics
- Conducted code refactoring, documentation and use of NLP and ML algorithms study for scalability

Machine Learning Intern | Chubb Insurance, Jersey City, New Jersey | September 2022 - March 2023
- Completed data extraction on unstructured documents for classification with Azure form recognizer API
- Implemented data postprocessing algorithm with regular expressions after information extraction
- Trained data on customized AI models with Azure Doc AI for entity detection with 80% accuracy
- Designed automated data capture tool by Azure entity extraction via FastAPI, Docker, Kubernetes, CI/CD test
- Developed a ML anomaly detection algorithm for fraud claims by probabilistic unsupervised learning

Student Technician III – IT Developer | University of Washington, Seattle, WA | August 2022 - September 2022
- Developed efficient documentation scheme for the codebase in C# and .NET
- Researched on code refactoring to improve code readability, maintainability and performance

Database Development Project | Institute for Health Metrics and Evaluation, Seattle, WA | June 2022 - August 2022
- Supervised a team for the project on database design and management
- Developed an Entity Relationship Diagram (ERD) with the existing database and SQL files for better efficiency
- Investigated issues in the architecture based on ERD for faster performance to read/write to the database

Deep Learning Project | University of Washington, Seattle, WA | April 2022 - June 2022
- Accomplished study on approximation, optimization and generalization theory, deep reinforcement learning, neural network architecture, transformer, encoder-decoder, representation and unsupervised learning
- Conducted a research article study on Long-Term Visual Dynamics with Region Proposal Interaction Networks
- Analyzed the representation learning for images and physical reasoning by Convolution Interaction Networks

Computer Vision Project | University of Washington, Seattle, WA | April 2022 - June 2022
- Accomplished study on image coordinates and transforms, resizing, filters and convolutions, interest

operators, image matching and stitching, face/object detection, CNN applications, motion/optical flow
- Conducted a research article study on Global Association Network for Lane Detection with ResNet architecture
- Developed a ResNeXt model as the backbone replacing ResNet with self-attention and achieved 94% F1 score

Applied Parallel Computing Project | University of Washington, Seattle, WA | April 2022 - June 2022
- Accomplished study on GPU utilization, CUDA and numba libraries in python and memory allocation
- Developed an algorithm to determine the Stereoscopic Depth Perception with 3 billion pixel calculations
- Implemented parallelization using global memory, 2D grid and 32 threads per block for faster computation
- Achieved an accuracy of 85% with 147x times faster computation compared to sequential algorithm

Code-To-Give Hackathon | Morgan Stanley, Alpharetta, Georgia| March 2022 - April 2022
- Designed a web application with HTML, CSS, JavaScript and Python with Bootstrap and Django framework
- Developed features for the application to schedule an appointment and setup a profile

Natural Language Processing Project | University of Washington, Seattle, WA | January 2022 - March 2022
- Accomplished study on language modeling, vector embeddings, morphology & WFST's, sequence labeling & conditional random fields, syntax, semantics, linguistic structure prediction, translation & sequence-to-sequence models
- Conducted a research article study on aspect-based sentiment analysis (ABSA) using supervised contrastive learning (SCAPT), transformer encoder and BERT
- Analyzed the results of the model and validated it with a new dataset achieving 86% accuracy

Software Development for Data Scientist Project | University of Washington, Seattle, WA | Sept 2021 - Dec 2021
- Developed real-time user-interface web application dashboard with streamlit framework in python to display stock price metrics with a trading algorithm based on sentiment analysis
- Collected an average of 1.6 million data points by gathering information from media posts related to a specific stock ticker and its corresponding stock price data
- Designed and implemented a sentiment analysis algorithm using the VADER module, which generated social media specific sentiments for the stock and converted them to a trading indicator
- Applied deep reinforcement learning to factor the trading signal and the company's stock price to make buy/sell decisions in a simulated trading environment for one year
- Achieved an overall accuracy of above 70% on model decision with the expected result

Data Science and Materials Informatics Project | University of Washington, Seattle, WA | Sept 2021 - Dec 2021
- Conducted a research article study on heterogeneous deformation in grain boundary regions on shock loaded tantalum element with nanoindentation
- Implemented machine learning-based analysis to compare with the experimental data
- Trained the data on linear and multilinear regression for the element characteristic predictions and used elbow and silhouette methods to predict optimal clusters on different nanoindentation methods
- Achieved 82% accuracy on regression and 80% on classification
- Applied ANN, CNN for image classification, KNN classification, decision trees, PCA, SOM, SVM and K-means clustering for large datasets of material properties to analyze and evaluate material features
- Developed ML models with visualization in seaborn, plotly, altair, bokeh, pygal, gleam, plotnine, matplotlib

Student Researcher | National Institute of Technology, Rourkela, India | January 2017 - December 2019
- Analyzed the coupled nonlinear dynamics of beam with moving mass to evaluate the modal behavior of system
- Designed fundamental geometric model with nonlinearities of the dynamic structure with energy conversion
- Applied Hamilton's principle, Galerkin Discretization and Method of Multiple Scales for analytical framework
- Developed MATLAB ODE solver algorithm for numerical analysis and simulation
- Achieved a confidence of greater than 90% between analytical, numerical and simulation results
- Published research article in the Journal of Applied Acoustics

PUBLICATION

Anwesa Mohanty, **Moses Prasad Varghese**, Rabindra Kumar Behera, "Coupled nonlinear behavior of beam with a moving mass", Applied Acoustics, Volume 156, 2019, pp. 367–377

PROFESSIONAL MEMEBERSHIP

Member | International Association of Engineers (IAENG) | August 2020 - Present

ADDITIONAL PROJECTS

Machine Learning with Material Science Project | University of Washington, Seattle, WA | Jan 2023 – Mar 2023
- Completed a course project and contributed to open-source python library solcore to model, analyze and visualize solar cells and semiconductor materials data

Machine Learning Certification | Stanford University (Coursera) | May 2020 – August 2020
- Developed a robust method of automated handwritten digit recognition with neural network learning
- Developed an SVM spam classifier with a training accuracy of 99.8% and a test accuracy of 98.5%
- Developed an image compression algorithm by K-means clustering
- Developed a PCA system for low-dimensional representation of 5000 image dataset
- Developed an anomaly detection system to detect failing servers on a network
- Developed a collaborative filtering learning algorithm to build a recommender system for movies

Robotics Specialization Certification | University of Pennsylvania (Coursera) | May 2020 – August 2020
- Developed a simple augmented reality application using KLT, homograph and perspective projection
- Developed a Kalman filter model for ball tracking in 2D space
- Developed a bundle adjustment algorithm to extract key elements of structure from motion
- Developed a particle filter algorithm for pose tracking in 2D space for robot localization from LIDAR
- Developed an Occupancy Grid Mapping tool with Log-odd update for a 2D map with sensor readings and poses
- Developed a simulation of Gaussian model for learning ball color and detection based on the color model
- Developed a two-link and six-link robot arm simulation to navigate through complex configuration space based on probabilistic road maps and artificial potential fields
- Designed and developed a simulation of 1D, 2D and 3D PD controller with trajectory generation

Professional in Product Design and Analysis | CADD Centre Training Services, Thrissur, India | December 2016
- Accomplished study on the software design and working of AutoCAD, CATIA, ANSYS
- Achieved 2nd position for the best design projects in AutoCAD and ANSYS

SKILLS

- Programming: Python, C/C++, SQL/NoSQL, MATLAB, R, C#, HTML, CSS
- Tools: Linux, Git, Docker, Kubernetes, Tableau, PySpark, Databricks, Jira, Jenkins, SonarQube, Azure, JSON, Visual Studio, Apache Spark, JupyterNotebook
- Frameworks: PyTorch, TensorFlow, FastAPI, NLTK, LangChain, Vertex AI, OpenCV, Keras, Scikit-learn, Streamlit, NumPy, Pandas, Seaborn, Matplotlib